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Dairy Div.

SYSTEMS OF HOG FARMING

IN THE SOUTHEASTERN STATES

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E. S. HASKELL
Assistant Agriculturist



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W. J. SPILLMAN Chief
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HOG RAISING has recently become an important farm industry in the boll weevil infested area of the Southeastern Coastal plain. Soil and climate are favorable to the production of forage crops adapted to economical pork production, and hogs serve as a source of income to offset the decline in returns from cotton. This bulletin tells how the more successful hog growers of this region fit hog raising into their farming systems, and outlines an elastic grazing plan, designed to provide for ten sows and their pigs without entailing much expense for costly concentrates. Peanuts, long the mainstay of the hog business of the region, enter into this system, but they are so combined with other forage crops as to extend the grazing system throughout the year and make more and better pork than can be produced on peanuts alone.

To illustrate good methods, the farm organizations of several well-managed hog-producing farms are described.

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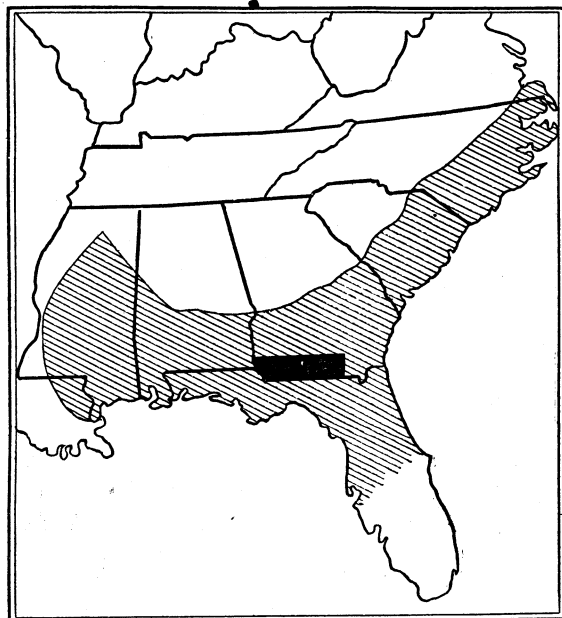
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THE RECENT ADVANCE of the boll weevil into the cotton-producing sections of the Southeastern States has brought home to the farmers of that section the necessity of reorganizing their farms so that they will be less dependent than heretofore on the single crop, cotton. Particularly is this true in the southernmost part of the area, where the mild winters and the frequent summer rains especially favor the growth and spread of the boll weevil, and render cotton growing even more hazardous and costly than it is but a short distance farther north. Among the enterprises adopted by the farmers of this Coastal-Plain area to partly replace cotton, hog raising has taken a prominent place. The long growing season and the prevailing light sandy soils favor the production and grazing of forage crops suitable for hogs. As a result, during the last three or four years a remarkable development of hog production has been taking place in the section mentioned, particularly that part comprising southwestern Georgia, southeastern Alabama, and northwestern Florida. A number of packing plants have recently been built in this region, thus assuring the growers a ready market. The hog industry is now on a substantial basis and very rapidly expanding. Many farmers having but little experience with hogs are going into the business on a more or less extensive scale. To these, as well as those who have long been engaged in the business, a study of the experiences and methods of the most successful hog producers in the area should be of special interest.

NOTE.—The data in this bulletin were secured in cooperation with the Georgia College of Agriculture. Special acknowledgment is due Prof. S. H. Starr, of that institution, and C. E. Hope, of the Office of Farm Management, for assistance in collecting the data.

The purpose of this bulletin is to point out the place that hog raising should occupy in the Coastal Plain; to outline a practical grazing plan and show how it may be fitted into the farm organization; and to illustrate good hog management by several concrete examples. The plan for hog production outlined, and the recommendations made herein, are based upon the actual experience of a large number of farmers in the counties of southwestern Georgia where hog raising has been longest established and where the recent rapid growth of the business has been most extensive. The farms in question include



WHERE DATA WERE OBTAINED
COASTAL PLAIN AREA TO WHICH PLAN OUTLINED IS BELIEVED
TO BE LARGELY APPLICABLE

FIG. 1.—Location of area.

those of the greater number of the more successful, experienced, and extensive hog producers of the area.¹

These farms are located on the light sandy soils in the southwestern part of Georgia. These soils, however, generally with a sandy surface and a sub-soil of a heavier texture, are fairly representative of the greater part of the Coastal Plain of this and the nearby States. The plan and facts presented are intended to ap-

ply directly only to these lighter soils which are so well adapted to the production of peanuts and which are not injured, even when wet, by the trampling and rooting incident to continuous grazing by hogs. On the heavier types of soils some modifications of the plan are either necessary or advisable. In figure 1 the heavily shaded por-

¹ This bulletin is based on data secured in a Farm Management survey made in 1915 in Brooks County, Ga. (see U. S. Dept. Bulletin 648), and upon a special study made in 1917 of 218 selected hog-producing farms in other counties of southwestern Georgia. In these studies detailed records were taken on each farm of all of the factors entering into the cost of growing hogs, in addition to which the methods of handling the hogs and the grazing crops were studied. In Brooks County hog raising has been carried on more extensively and for a longer period, perhaps, than in any other place in the South. For several decades hogs have been one of the most important farm products of this area.

tion shows the area from which the data presented were secured, while the lighter shading indicates the regions to which the data and discussion are believed to be generally applicable.

The type of hogs known as "piney woods" or "razorback," formerly so numerous, is rapidly disappearing from the region, owing to the extensive introduction of sires of the improved breeds and the establishing of many breeding herds of high-grade and pure-bred hogs. The Duroc Jersey and Berkshire breeds are at present probably the most numerously represented, while many Poland Chinas are found. The Hampshires, more recently introduced, are proving well adapted to the region and are rapidly becoming popular. Practically none of the white breeds are grown.

PLACE OF HOG RAISING IN THE FARM BUSINESS.

The extent of the development of hog raising in the Southern Coastal Plain has been, and no doubt will continue to be, determined largely by the spread of the boll weevil and the extent of the damage to the cotton crop by that pest. Since the losses caused by the weevil increase toward the southern part of the cotton-producing area, it is here that the greatest expansion of hog raising is taking place and where the largest further development may be looked for.

In but very few places in the South where the conditions are favorable for growing cotton have hogs been produced as an important product for the market. An apparent exception is found in Brooks County, Ga., where hogs were an important source of farm receipts long before the advent of the boll weevil. A farm management survey made in that county just prior to the invasion of the boll weevil showed that the farms most heavily stocked with hogs gave the best net returns.¹ However, the investigation was made in the southern half of Brooks County, where the soils are too light and sandy to permit the continuous growing of cotton. On this type of soil it was found to be essential to resort to such an expedient as the growing and grazing of legumes, such as peanuts, in order to maintain the soil fertility at a point where profitable yields of cotton could be grown. Farther north in the county, where the soils are somewhat heavier and better adapted to cotton, comparatively few hogs were raised for market, cotton here proving to be the more profitable product. But the advent of the boll weevil rapidly changed this situation.

Hog raising is a less intensive type of farming than is cotton growing, requiring relatively much less labor per acre of land farmed. With the former, one man can handle a larger acreage, the net returns per man will usually compare favorably with those

¹ See Dept. of Agri. Bulletin No. 648, pp. 40-41.

from cotton. A shortage of labor will therefore sometimes lead to an increase of hog raising at the expense of cotton.

On the great majority of farms throughout the Coastal Plain some hogs are raised, and on nearly all of the farms a sufficient number should be grown at least to supply the needs of the farm for meat and to consume farm products that would otherwise be wasted. Whether the business should be further extended will be largely determined by questions of soil fertility, scarcity of labor, or boll-weevil damage. Because hogs will utilize crop residues and other waste products the raising of hogs can usually be carried on most economically in conjunction with other major farm enterprises. For this reason very few farms in this region are organized solely for producing hogs. How the business may be combined with the types of farm organization prevailing will be pointed out in the following pages.

EXAMPLES OF SUCCESSFUL HOG PRODUCTION.

Three farms have been chosen as illustrating well-balanced grazing systems, good hog management, and profitable production. They were selected more or less at random from among a group of 27 farms on which good grazing was provided throughout the year. They are not presented as ideal, but as plans actually in operation which combine many excellent features worthy of adoption. Figures given are based on costs and prices for the year 1916.

FARM NO. 1.

This farm was chosen for illustration because it presents the possibilities of a well-managed farm, organized exclusively for hog production. The farm contains only 100 acres, of which 84 acres were planted to crops, 4 in Bermuda pasture and the remaining 12 in woods, roads, and other nonproductive land. The soil is a sandy loam, fairly representative of the region, and it had been brought to a high state of fertility by the system of grazing followed.

Twenty sows and two boars, all pure bred, were kept on this farm; 160 pigs were sold and 12 were slaughtered at home, the average weight of all being 225 pounds, or a total of 36,450 pounds of live pork produced. The pigs sold were disposed of for meat purposes at an average price of \$7.11 per 100 pounds.

All of the sows but one (a gilt) brought two litters each, making a total of 39 litters, and approximately $4\frac{1}{2}$ pigs were raised per litter, a rather low average. Half of one man's time was required to feed and care for the hogs, the other half being devoted to the production of the feed crops. In addition to the hogs, the farm maintained four cows, three mules, and one driving horse.

The grazing system on this farm is of particular interest. The crops and acreages used and the periods during which each were grazed are shown in figure 2. Five and two-tenths hogs per acre were maintained or produced on this farm. This high carrying capacity is more than double the average of the 218 farms studied in this locality, and is attainable only on very fertile land. The acreages in oats cut for grain, and in oats, rye, and rape pastures, produced a crop of hay in addition to the grain and grazing. The 40 acres planted to corn, peanuts, and velvet beans are counted as 20 acres of grazing crops, since the corn was harvested before the hogs were turned in.

In addition to these grazing crops the hogs received 150 bushels of corn, 2 tons of shorts, and 750 pounds of tankage. The combined cost of these concentrates made up slightly more than one-fourth of the

CROPS	A. OF CROPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OATS FOR GRAIN (a)	11												
OATS & RYE PASTURE	4												
RAPE	2												
BERMUDA PASTURE	4												
CATTAIL MILLET	3												
EARLY CORN & COWPEAS	10												
(EARLY CORN & SPANISH PEANUTS	10												
(NORTH CAROLINA PEANUTS & VELVET BEANS	(b) 20												

(a) GROWN PRIMARILY AS A GRAIN CROP.

(b) INTERPLANTED WITH 40 A. OF CORN, THE LATTER BEING HARVESTED. THE PEANUTS AND BEANS THEREFORE ARE TREATED AS 20 A. OF GRAZING CROPS.

FIG. 2.—Grazing scheme in operation during 1916 on farm No. 1. Twenty sows and 2 boars were kept, and 172 pigs raised.

total feed cost. The items of cost other than feed were: Labor, \$335; interest and taxes, \$104; serum, \$100; dipping material and medicines, \$20; and equipment charge, \$21. The last item consisted principally of the annual cost of the share of the fences chargeable to the hogs. The total net cost of production amounted to \$4.46 per 100 pounds of live weight, as compared with the average of \$5.58 for the 218 farms.

Nearly all of the feed consumed during the year in question (1916) was grown on the farm, but no crops of any kind were sold. Of the farm receipts, hogs contributed \$2,485; 2 calves sold, \$21; man, team, and binder work off the farm, \$65; the remaining \$290 representing increased amounts of feeds and supplies on hand at the end of the year. The farm expenses amounted to \$1,390, of which the largest items were \$360 for a wage hand, \$100 for extra labor, \$261 for de-

preciation of buildings and machinery, \$194 for fertilizer and compost, \$100 for feeds purchased, \$100 for hog cholera serum, and \$77 for taxes and insurance. Subtracting the expenses from the receipts, left \$1,471 as the net farm income, including interest on investment. In addition to this the farmer had the living that the farm furnished to him and his family, the money value of which would amount to several hundred dollars. This farmer has other business interests and he devoted only one-third of his time to the management of this farm, although he made his home upon it. Had he given all of his time to the farm he would have saved all or nearly all of the \$360 that he paid the wage hand. The sum of these items represents a satisfactory return for a business of this size. The farm real estate was valued at \$7,000, the investment in live stock amounted to \$2,165, the implements and machinery to \$578, the feeds and supplies \$284, and \$250 in cash was needed to operate the business, making a total farm capital of \$10,277. The farm is close to a town, hence the real estate is valued at considerably above the average price for the area.

FARM NO. 2.

Figure 3 shows the grazing crops, acreages, and grazing periods for each crop on a farm that kept 27 old sows, 13 gilts, and 2 boars. This farm is a large one, hog raising being only one of several important enterprises. One hundred and sixty-nine hogs were slaughtered on the farm and 90 were sold to the packing house, the average live weight of all being 212 pounds. The total net live weight gains grown amounted to 53,423 pounds, produced at the low cost of \$4.69 per 100 pounds. None of the gilts brought more than one litter, and only 20 of the old sows farrowed twice, making an average of $1\frac{1}{2}$ litters per sow. The number of pigs raised was 6 per sow, or 4 per litter, which is a rather low average.

The grazing crops maintained or produced 3.2 hogs per acre, which is nearly 70 per cent higher than the average for all of the farms. The fertility of the soil had been brought to a high state by the liberal use of legumes for a number of years.

Twenty acres of turf oats and winter vetch furnished grazing from December to April, inclusive, and 10 acres of rape were pastured from November to May. Three plantings of rape were made from August to January 1. During November and December, these crops were grazed by the sows and small pigs, while the fattening hogs had the run of the peanuts, velvet beans, and sweet potatoes. Through May, June, and July, 6 acres of cat-tail millet and $7\frac{1}{2}$ acres of Bermuda grass and lespedeza were pastured, the latter extending through the three following months as well. Three plantings of the millet were made from March to May. In June these pastures were supplemented by a 40-acre field of oat stubble for

three weeks, or until the field was plowed for a succeeding crop. During August and September, the hogs intended for market were transferred from the millet to 20 acres of Spanish peanuts, and by the end of September they were turned on to 75 acres of North Carolina peanuts and velvet beans, where the principal gains were made, the hogs being killed or sold during December and January.¹ From the middle of October 6 acres of sweet potato culls were also pastured, the culls being equal to about one-fourth of a full crop.

The sows and small pigs had the run of the Bermuda and lespepeza from August to October, besides "cleaning up" both fields of peanuts and velvet beans after the fattening hogs had gotten the bulk of the feed.

One hundred and fifty bushels of corn, 5 tons of tankage, and 300 barrels of sugar-cane-sirup skimmings (slop) were fed to these hogs

CROPS	ACRES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TURF OATS AND VETCH	20												
RAPE	10												
CAT TAIL MILLET	6												
BERMUDA GRASS AND LESPEDEZA	7½												
OAT STUBBLE	40												
SPANISH PEANUTS	20												
NORTH CAROLINA PEANUT & VELVET BEANS	(a) 75												
SWEET POTATOES	(b)												

(a) Interplanted with 150 A. of corn, the latter harvested, hence considered as 75 A. of peanuts and beans.

(b) Culls from 6 A.

FIG. 3.—Hog-grazing crops on farm No. 2, which maintained during 1916 40 sows and 2 boars, and fed 259 pigs until marketed.

in addition to the crops grazed. The combined cost of these feeds equalled slightly more than one-fourth of the total feed cost. The skimmings were by-products of a large sugar-cane-sirup mill operated on this farm.

FARM NO. 3.

This farm is also a rather large one, hog raising being only one of the major enterprises. Twenty old sows and two boars were kept; 244 hogs were sold to the near-by packing house and 56 were killed on the farm, the average weight being 180 pounds. In addition, there

¹ These North Carolina peanuts and velvet beans were interplanted with 150 acres of corn, but, as previously explained, the corn was harvested and the grazing crops therefore considered as equivalent to 75 acres of crops.

were 18 more sows (gilts) and 20 more fall pigs on hand at the end than at the first of the year. The number of pigs raised per sow was, therefore, 14, which is a very high average. The pigs were farrowed during October and April.

The crops, acreages, and grazing periods of the hog-pasture scheme on this farm are shown in figure 4. The number of hogs kept per acre of crop land used was 2.6, which is somewhat higher than the average of the whole number of farms studied, but is the same as that allowed for in the plan to be outlined later. In this grazing scheme, as in those already discussed, oats and rye furnish the greater part of the pasturage during the late winter and early spring months, aided until the middle of February by velvet beans, and from the middle of April on by Bermuda grass. The 10-acre field of oats was seeded on low land infested with Johnson grass. The roots

CROPS	ACRE CROPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OATS AND RYE	30												
JOHNSON GRASS AND OATS	10												
BERMUDA GRASS	2½												
SORGHUM	5												
EARLY CORN, SPANISH													
PEANUTS AND BRABHAM	22												
COWPEAS													
SWEET POTATOES	5												
NORTH CAROLINA PEANUTS & VELVET BEANS	(a) 62												

(a) Interplanted with 125 A. of corn but since corn was harvested the peanuts and beans are considered as 62 A.

FIG. 4.—Hog-grazing crops on farm No. 3. Twenty sows and 2 boars were kept, 244 pigs were sold, and 56 were slaughtered on this farm.

of the latter furnished a large amount of feed in addition to the oats. Early in June this field was replanted to another crop, to be reseeded to oats in the fall to serve as a hog pasture the following year. In May the 30-acre oats and rye pasture was replanted to other crops, among them the 5 acres of sweet potatoes hogged off. From the middle of April until the first of June the sorghum and Bermuda grass were grazed alternately. By that time the 22-acre combination crop of early corn, Spanish peanuts, and Brabham cowpeas was ready. Many of the fall pigs were finished and marketed from this crop, bringing the high prices of the September market. The other hogs were finished on the North Carolina peanuts, velvet beans, and sweet potatoes and marketed at intervals until January.

In addition to the grazing, the hogs on this farm were fed 150 bushels of corn and 2½ tons of shorts. All of this concentrated feed,

except a small amount of shorts given to the sows while suckling the fall pigs, was fed from March until early in July, the heaviest feeding occurring during March. The cost of these concentrates amounted to less than one-seventh of the total cost of production. The net cost of producing these hogs reached only the very low figure of \$3.05 per 100 pounds of gain.

FEEDS AND FORAGE.

It is so generally recognized that feeds constitute the bulk of the cost of hog production, that it is usual to state the cost in terms of the feed used. Profits and losses shown by feeding experiments are commonly calculated solely upon the basis of the feeds consumed. It was found that the feeds account for approximately four-fifths¹ of the total cost of producing hogs on the farms studied in the southeastern Coastal Plain.

CONCENTRATES.

In this region of mild winters and year-round pastures, the amount of dry feeds needed to supplement the crops grazed is much smaller than that required in colder sections. Practically all of the crops here used for finishing hogs for market are grazed off instead of being harvested before feeding. Thus on the 218 farms only a little more than one-sixth (17.2 per cent) of the entire cost of feed was found to be chargeable to the feeds other than crops pastured. That even this low proportion of the more expensive feeds is larger than necessary is indicated by the fact that on the group of 27 farms which provided substantially complete year-round grazing systems more than nine-tenths (90.2 per cent) of the feed cost consisted of crops pastured. With a well-balanced system of grazing crops provided, it is not necessary to supplement it with concentrated feeds except during a very few months, and then only to a limited extent.

During the spring and early summer months, or from March to June, when the pastures are not so plentiful or of as good quality as at other times, all of the hogs should be fed some concentrates in addition to pasture. At this season the pastures are low in protein content, hence a limited amount of such feeds as shorts, tankage, peanut meal, or velvet beans, in addition to corn, may be fed to advantage, at least to the sows and suckling pigs. Again, in the fall months, when the sows are farrowing and until the pigs are weaned, they should receive a light grain ration on pasture. A common and satis-

¹ On the 218 farms the total feed cost was 79.6 per cent of the gross cost of production, or 84.5 per cent of the net cost, the difference between the gross and net costs being the credit for manure. Crops grazed off, for which there was no definite market price, were charged at the cost of production. Other feeds were charged at the farm or purchase price.

factory rule is to feed during these periods an ear of corn per sow per day, supplemented by one or more of the other feeds mentioned above. At other periods than those referred to, the grazing crops commonly used provide a sufficiently concentrated feed for producing the most economical gains.

The most important crops grazed by hogs in this section, notably peanuts and velvet beans, are rich in protein. Hence, at least in fattening hogs, it is not necessary to feed much, if any, of the expensive high-protein concentrates. Corn, therefore, is the principal dry feed used. It is followed in order on the farms studied by shorts, tankage, and a miscellaneous list consisting of velvet beans and meal, oats, cottonseed meal, peanut meal, and a few others. On 218 farms corn accounted for more than 90 per cent of the cost of all concentrates, shorts amounted to slightly less than 5 per cent, and all other concentrates made up the remaining 5 per cent. Expressed in another way, for every 1,000 pounds of gains, 10.3 bushels of corn, 20 pounds of shorts, and 20 pounds of other concentrates were fed in addition to the crops pastured. On 27 farms with practically 12 months of grazing per year the quantities fed per 1,000 pounds of gain were 6.8 bushels of corn, 33 pounds of shorts, and 43.5 pounds of other concentrates.¹

With the rapid increase in the plantings of velvet beans in the region, many growers are learning that the harvested beans, usually soaked and fed in conjunction with corn, affords a satisfactory and one of the most economical concentrated feeds available. (See pp. 22-24.)

GRAZING CROPS.

Throughout this Coastal Plain region a very large proportion of the land area consists of timber and cut-over land, much of it unfenced.² This land furnishes a low-grade pasture from which it is possible for hogs to obtain a scant living at small expense to the owners. It has, therefore, been a common practice to depend, to a large extent, upon this woodland, either fenced or as an open range, to carry the hogs through the spring and early summer months when grazing crops are least plentiful. Peanuts have furnished the cheapest feed available for fattening hogs, and upon it the growers have mainly relied to finish the hogs for killing or for market. This has meant, in such cases, that from the time one peanut crop was grazed off until the next crop was available, or from January or the end of

¹ Throughout this bulletin all quantities and costs of feeds, live-weight gains, and other items include the whole hog enterprise, including the sows and boars, as well as the pigs raised.

² For example, in a representative county, Brooks County, Ga., at the time of the last census the improved farm land amounted to but 43 per cent of all land in farms or 36.9 per cent of the total land area of the county. Nearly all of the remaining 63.1 per cent of the land consists of timber and cut-over land. (See U. S. Department Bulletin No. 648, p. 4.)

February until the middle of September, the hogs were underfed and stunted, and heavy losses from cholera and other epidemics resulted. The method described has produced hogs at a low cost per pound. But to grow hogs on this low-grade woodland and open-range pasture requires a large area per animal, and when production is undertaken on a large scale, as is now being done, the range available no longer suffices.

With the rapidly increasing production of hogs in the region the growers have given closer attention to all phases of the business, including the growing of grazing crops during all months of the year. The result is that more or less complete grazing systems are being worked out on the farms. To determine the relative profitableness of providing different amounts of grazing, the 218 farms studied were divided into groups on the basis of the number of months during which pasturage was furnished by planted crops and permanent pastures. "Piney woods" pasture was not considered. Farms that supplied from three to four months of pasturage produced hogs at a cost of \$5.59¹ per 100 pounds of live weight gains; those that supplied pasture five to six months of the year showed the slightly lower cost of \$5.43 per hundred pounds. The remaining three groups of farms, with 7 to 8, 9 to 10, and 11 to 12 months of grazing, respectively, showed the somewhat increasing costs of \$5.85, \$6.11, and \$6.63 per hundred pounds of gain. This indicates that it costs slightly less per pound to depend upon woodland pasture and open range to furnish most of the grazing during half of the year than to provide pasture crops during the months when they are the most expensive and difficult to produce.

The costs, however, do not tell the whole story. The "piney-woods" hogs are underfed during half of the year, hence are small and of poor quality, with the result that the lower prices they bring on the market offset the slightly lower costs of production, to say nothing of the greater risks and losses from cholera and other epidemics resulting when that method of handling hogs is followed. Furthermore, the method in question requires a large area of land per hog and is not applicable to raising hogs on a large scale. The farms in this study that provided only a few months of grazing averaged comparatively few hogs per farm, whereas on those raising hogs on a considerable scale it was found necessary to provide longer grazing periods. It should be remembered, also, that many of the farmers with the complete, or nearly complete, grazing systems are

¹ All of the costs given in this bulletin are for the year 1916 and represent close to the normal prewar scale of prices. The costs at the present time (1918) would, of course, be considerably higher. But the comparative rather than the absolute costs are of interest in this study; hence the conclusions to be drawn are not affected by the changed scale of costs. In computing costs of hog production every item of expense has been considered, including the pro rata share of all of the overhead expenses of the farm.

comparatively new to the business on the enlarged scale and have been doing more or less experimenting with grazing crops, and experimenting is likely to mean high costs of production. Many of them have hit upon very efficient and economical combinations of crops and are thereby producing hogs at a very low cost. Several of the best of these are discussed in detail in another part of this bulletin.

OATS AND RYE.

At least one of these crops is found on practically every hog farm in the region, often both. They are seeded either alone or together, or in mixtures including rape, and occasionally barley or wheat. Many believe that the mixtures furnish more feed than do the same acreages of these crops seeded separately, though most growers do not express strong preferences. Oats and rye are in most cases the crops mainly depended on for pasturage during the late winter and spring months. If seeded early they will furnish feed during the early winter months as well. Rye is here most commonly grown as a pasture crop only, though frequently the stock is removed early in the spring and a crop of grain allowed to mature. Most of the hog raisers seed some oats for pasture only and other fields to produce a crop of grain. Some seed a large field of oats and pasture it all until about the 1st of March, when a part of the field is cut off by a temporary fence, to be grazed until May or June, the remaining area being left to mature a crop of grain. This plan has much to commend it. It insures a sufficiency of pasture during the period when other feeds are least plentiful. It makes the grazing scheme elastic in that the area to be fenced off for pasturing may be more or less, according to the growth of the other crops. Care should be taken not to pasture too long or too closely the area from which a grain crop is to be harvested, or the resulting reduced yield of grain may amount to more than the value of the grazing secured.

The Winter Turf oat is not commonly grown in this section, but as a pasture crop it has distinct advantages over other varieties. Its ability to stool freely enables it to withstand grazing and furnish more pasture than the other sorts. The Fulghum oat, now widely grown in Georgia, does not stool sufficiently to make it desirable for pasturage.¹

RAPE.

Rape should have a place in almost every grazing system for hogs in this area; it may be planted by itself, either broadcast or in drills, or seeded in a mixture with oats and rye. When planted alone it will usually yield better and be injured less by trampling if it is seeded in drills so that it may be cultivated. Rape may be seeded in this sec-

¹ For a full discussion on growing winter oats see Farmers' Bulletin 436.

tion at any time from August to February, and by making successive plantings it will furnish pasturage from October until the first of June. Three or four plantings should be made if it is desired to provide for this whole period. But it is from January until May or the first of June that this crop is especially valuable as a source of feed, since previous to that time there is an abundance and variety of other feeds available. Two plantings are sufficient to provide for that period. To produce a satisfactory yield rape requires a fertile soil or a heavy application of fertilizer, but given good conditions few crops will produce as much grazing from the same acreage. Dwarf Essex is the variety grown here practically to the exclusion of all others.

BERMUDA GRASS.

A permanent pasture of Bermuda grass should have a place on every hog farm in this section. This grass will provide good grazing from about the middle of April until frost, which usually occurs about the middle of November (see fig. 5). To overcome the tendency to become "root bound," the pasture should be plowed in the fall at least every two or three years and seeded to oats or rye. Some growers prefer to plow it every year and apply fertilizer when the oats are seeded. This is a good practice. However, the plowing should not be done during a dry, hot period, or most of the grass roots may be killed.

There are in the region large areas of very light soils on which it is frequently difficult to secure a satisfactory growth of Bermuda. On these the use of fertilizers is often necessary. Many of the farms include more or less limited areas of rather low land, either as "sinks" or stream "bottoms," which, because they overflow or are poorly drained, are not well suited to cropping. But these areas, because of the heavier and more fertile soil and more abundant moisture, will in many cases furnish the best permanent pasture on the farm. Where practicable, they should be utilized for that purpose. On those soils in the southern part of the Coastal Plain where the water table is close to the surface carpet grass will do even better than Bermuda and may to advantage be substituted therefor.

CAT-TAIL MILLET.

Cat-tail millet, often known as pearl millet, *Pennisetum*, or Egyptian millet, has only recently been grown to any extent as a hog pasture in this section, and its value is as yet known to only a small proportion of the hog producers, though its use is being rapidly extended. The great value of this crop lies in its ability to furnish pasture early in the spring, the period during which it is hardest

to provide cheap feed. No other spring-planted crop in use in the region will do this quite so well as cat-tail millet. Planted early in March, preferably in 3-foot drills, it is ready to be grazed in from four to six weeks, or by the middle of April. It is important that the hogs be turned on early, when the plants are not more than 6 inches high, since this induces stooling and greatly increases the carrying capacity of the crop. This crop is a very rapid and rank grower, and if kept properly pastured down will carry a large number of hogs on a small acreage. When small, this millet is tender and much relished by hogs, but if allowed to grow to any considerable height it becomes woody and unpalatable. If kept fully pastured this crop will provide grazing until at least the middle of July. If two or three different plantings are made during March, April,



FIG. 5.—Hogs on Bermuda pasture.

and May, the grazing period may easily be extended through September. (See fig. 6.)

SORGHUM.

Two varieties of sorghum are commonly grown for hog feed in this section, the Early Amber and Orange. The former is planted for early feed, but the latter will produce a heavier yield, extending over a longer period. As a hog pasture, sorghum is sometimes sown broadcast, but is more commonly planted in drills, sometimes in rows alternating with cat-tail millet. Sorghum will not withstand the close grazing that gives the best results with millet. But the young millet being the more tender is more relished by hogs, and hence is eaten first, when the two crops are grown in the same field, thus allowing the sorghum to attain sufficient size to return a good

yield of forage. These two crops supplement each other, giving variety to the feed, when planted either in alternate rows or in different parts of the same field.

Sorghum is cut and fed as a soiling crop to an even greater extent than it is used for grazing.

EARLY CORN.

Early corn, particularly some of the dent varieties, is very useful in providing a fattening feed early in the season. Planted in the spring, it is ready for either soiling or grazing by the middle of July. Some hog growers plant early corn by itself, but more commonly it is planted in alternate rows with Spanish peanuts. Many plant

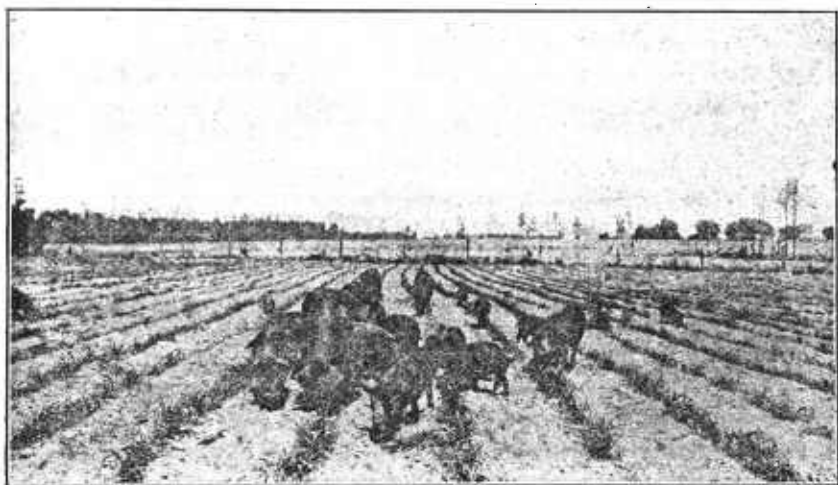


FIG. 6.—Cat-tail millet fits admirably into the grazing system. Planted early, it provides a large amount of much-relished pasture at a time when other feeds are scarce and expensive. The hogs should be turned on early to induce stooing and prevent the millet from becoming large, "woody," and unpalatable.

Spanish peanuts "solid" and add early corn to every alternate row of the peanuts. The corn is then cut and fed as a soiling crop, the hogs being turned into the field later to gather the peanuts. This plan has the important advantage of furnishing earlier feed from the corn than when the two crops are grazed together, since the very early varieties of corn mature about two weeks sooner than the Spanish peanuts. When the two crops are to be grazed together, a medium early corn should be planted.

Usually it is important to secure feed as early as practicable, and for this purpose the earlier varieties of corn planted with an early variety of cowpeas, broadcasted between the corn rows, fills an important place, except on some of the lighter soils, to which the cowpeas are not well suited. The "two crop" clay variety is commonly

used for this early planting. As its name implies, this crop, or the mixture with early corn, if planted early, may be matured and grazed off in time to allow the land to be replanted the same season to the same crops or to Spanish peanuts.

Soy beans may be advantageously substituted for cowpeas on the heavier types of soil. But on the light soils to which this bulletin is intended especially to apply, soy beans are a very uncertain crop.

CRAB GRASS.

Crab grass volunteers abundantly on land from which a crop of oats, rye, or watermelons have been harvested and in fields allowed to lie idle for a part of the growing season. It produces a fair amount of cheap and palatable pasturage that may profitably be utilized. Oat stubble may be grazed for two or three weeks and still be seeded to cowpeas or some other crop the same season, thus helping materially at a time that feed is usually relatively scarce and expensive. Frequently hogs are allowed to graze stubble fields from the time the grain crop is removed until frost. Occasionally a field is plowed in the spring, and sometimes fertilized, then allowed to produce a volunteer growth of grasses, largely crab grass, for grazing through the entire season. This is sometimes an economical practice.

FLORIDA BEGGARWEED.

In the southern part of the Coastal Plain Florida beggarweed volunteers along with crab grass. If grazed before it attains too large a growth, the beggarweed furnishes an excellent quality of pasturage. As a cultivated crop beggarweed gives a rather light yield, but as a volunteer crop it is a valuable addition to the grazing system, and, being a legume, is of value for soil improvement.

Watermelons are here grown extensively for shipping. A considerable amount of grazing is furnished by the cull melons, together with the following growth of crab grass, often supplemented by cowpeas planted between the melon rows. Most of the feeding value of the melons is in the seeds.

CHUFAS.

Small acreages of chufas are found in many of the hog-grazing systems of this region. Chufas are easily and cheaply grown and produce a heavy yield of feed of which hogs are fond and which adds variety to the ration. They require a long growing season, but will remain in the ground for several months after maturing, furnishing grazing over a long period. Like rape, sorghum, and millet, this crop, unless liberally fertilized, draws heavily upon the soil fertility. It has the added disadvantage, in common with peanuts, of producing soft pork.

PEANUTS.¹

The light sandy soils of this section are especially well suited to the growing of peanuts, and for years the crop has been an increasingly important one. Peanuts are so easily grown here, are so much relished by hogs, and produce such rapid and cheap gains of pork that for fattening purposes they have deservedly been the main dependence of nearly all of the hog producers. However, a large proportion of the hog raisers have relied too exclusively upon this crop, failing to provide a sufficiency of other feeds during the periods when the peanuts are not available for grazing. The extent to which peanuts are depended upon by the hog growers can be shown by the cost figures. On 218 farms the cost of the peanuts included 44.2 per cent of the total cost of producing the hogs, which equals 55.4 per cent of the total feed cost or two-thirds of the cost of all grazing crops. Even on the farms that provided complete year-round grazing the peanuts furnished one-half the feed, measured in terms of cost.

Two varieties of peanuts are grown in this area for hog grazing, the North Carolina, or African, sometimes known as the "Georgia" peanut, and the Spanish. The former is a long-season, heavy-yielding, "running" variety, which has the valuable property of remaining in the ground for a long period after maturing, without sprouting or spoiling. Until recently this was practically the only peanut grown in the area where the material for this bulletin was secured, and it is still the one relied upon to furnish the bulk of the feed for fattening hogs. It must be planted early in the spring, is ready to be grazed by the middle of September, and supplies good continuous grazing until January, or, if desired, it can be pastured until March. No other crop grown in this section is as cheap a source of feed for fattening hogs. One acre planted "solid" (i. e., not interplanted with corn) will, without any other feed, fatten three or four shoats.

The Spanish peanuts are much quicker growing than the North Carolina variety. For this reason they fit well into a hog-grazing system, either to supply early feed before the main fattening crops are mature, or for planting late in the season following such crops as oats, rye, or watermelons. Planted early in the spring, Spanish peanuts are ready for pasturing by the first of August, or six weeks earlier than the North Carolina variety. This is a part of the season when other cheap pasture crops, particularly "finishing" crops, are not plentiful. On the other hand, the experienced hog growers consider that the Spanish variety, though by no means a light yielder, does not produce nearly as much feed as the longer-season sort, the

¹ For a discussion of varieties and methods of growing peanuts see Farmers' Bulletin 431.

usual estimate being that the latter has 50 per cent greater carrying capacity than the former.¹ Accordingly, they plant for grazing purposes only enough of the Spanish to carry the hogs until the other variety is available. Furthermore, the Spanish peanuts, when planted in the spring, as is commonly done here, can be pastured for a period of only a few weeks at most, unless the weather remains dry. If considerable rain falls after the crop matures, these peanuts will quickly sprout or become rancid, moldy, and otherwise unfit for feed.² But when planted as indicated, they fill a valuable place in the grazing scheme.

Spanish peanuts are now being grown extensively as a crop to be harvested and sold on the market, principally to the oil mills. When grown for this purpose, there is a considerable amount of feed left in the field after the crop is harvested, and this may be utilized to excellent advantage by hogging off. (See fig. 7.)

While peanuts furnish an excellent feed for fattening purposes, and the hogs will continue to make rapid gains on the crop for a period of 60 to 90 days, they should not be kept exclusively on peanuts for a longer period than that or digestive disorders are likely to develop. But if other feeds, such as sweet potatoes, chufas, or velvet beans, are grazed along with the peanuts profitable gains may be secured during a more extended period.

Care must be exercised in pasturing brood sows upon peanuts. Until a killing frost occurs in the fall the sows may with reasonable safety be turned into the field, for prior to that time they will eat enough peanut vines and other green stuff to prevent sickness. But after a frost and until the bulk of the crop has been consumed, only fattening hogs should be grazed on the peanuts. If by that time the fattening hogs are not ready for the market they should be transferred to another field and the sows and young pigs turned in to clean up the first field. The exercise that the sows are forced to take in thus gleaning the field prevents them from putting on too much

¹ This experience of the farmers is at variance with the results obtained from experiments conducted by the Department of Agriculture and the Alabama Experiment Station. These experiments indicate that the yield of the Spanish peanut is fully equal to that of the North Carolina variety. The probable explanation is that since these farmers have long been accustomed to growing the "running" variety, and have only recently planted the Spanish to any considerable extent, they have planted the latter too far apart to secure the best yields. The Spanish is an erect-growing plant and should be seeded not more than 6 inches apart in rows 2½ to 3 feet apart, whereas the larger and spreading "running" variety is planted from 12 to 18 inches apart in rows spaced from 3 to 3½ feet.

² This is no doubt due largely to the fact that the spring-planted Spanish peanuts mature during the crop-growing season, when conditions are favorable for germination. Experiments conducted by the Department of Agriculture indicate that when the two varieties are planted so as to mature at the same time the keeping qualities do not differ widely. If the Spanish peanut is to be planted to the exclusion of the North Carolina, both early and late plantings should be made. The late planting may well follow a crop of oats or rye. The Spanish variety has a further advantage in that the erect-growing tops may be cut and a good quality of hay secured.

fat and avoids the digestive troubles that are almost sure to result if they are grazed with the fattening hogs.

Figure 8 shows a combination crop of peanuts and beggarweed grown in an unusual way, but one that proved very economical.

VELVET BEANS.¹

The recent introduction of the early-maturing varieties of velvet beans has greatly extended the area in which this valuable crop may be grown and matured with profit, and has resulted in a rapid increase in the area devoted to the crop, especially in that part of the Coastal Plain infested with the boll weevil. This crop has an important place in hog farming, both for grazing and as a source of concentrates to be fed during seasons as a supplement to other pasture.



FIG. 7.—Hogs cleaning up a field of Spanish peanuts that have been harvested for the market. The peanuts have been stacked and fenced in the center of the field.

Velvet beans are almost invariably planted with corn, often in alternate rows, sometimes with two rows of corn alternating with each row of beans, and frequently in conjunction with corn and peanuts, the corn and peanuts in alternate rows and the velvet beans planted later in the same row with either the corn or the peanuts. This combination is an excellent one and undoubtedly results in a larger and more economical yield of feed from an acre than is produced by any one or two of these crops grown separately. Still other combinations are occasionally met with (see fig. 9). The late-maturing varieties of velvet beans, producing an excessive growth of foliage, will often so cover the corn and peanuts as to reduce greatly the yield of the peanuts and make it difficult or impossible to gather the corn. But the usual experience of the farmers is that the early-maturing varieties of beans reduce the yields of these companion crops but

¹ For a full discussion of velvet beans, see Farmers' Bulletin 962.

little or not at all; certainly not sufficiently to materially offset the yield of beans produced.

Corn, peanuts, and velvet beans are thus planted in combination only when the peanuts and at least a part of the beans are to be grazed off. The corn, and often a part of the mature beans, are harvested early and the hogs are then turned in to gather the peanuts. The hogs have a strong liking for the peanuts and will not eat many beans while the former are available. If a sufficient acreage of North Carolina peanuts is planted to carry the hogs until the end of the year, the beans will have become sufficiently softened by rains or by moisture from the soil to be palatable. The beans will then furnish



FIG. 8.—Hogging off peanuts and beggarweed, following a crop of oats that had been harvested. The peanuts were planted between the oat drills when the oats were heading.

grazing until about the 1st of March, or even later if the land is not plowed.

It is often difficult to get hogs to commence eating velvet beans, especially early in the season, when they are too hard to be palatable. This means that, as ordinarily handled, the beans will not be readily grazed until after several killing frosts and the beans have been more or less trampled and thus softened by the moisture from the soil. If the weather is dry this may be very late in the season. Frequently, it is desirable to have the beans grazed earlier. This may be hastened by plowing under the crop. The beans then are quickly softened by the moisture absorbed from the soil, and since they are found in bunches, they are readily rooted out by the hogs and consumed with but little waste. Only a few farmers have yet learned this practice, but these few are following it with excellent results. In the case of

the velvet bean-peanut-corn combination crop, the plowing should be done as soon as the greater part of the peanuts is grazed off.

On most of the farms studied cattle were turned into the fields of velvet beans to gather from one-half to three-fourths of the crop, the remainder, sufficient to carry the hogs, remaining on hand after the peanuts were grazed off. The common practice is to market most of the fattening hogs directly from the peanuts, leaving only the sows and fall pigs to graze on the beans. However, if the beans are turned under as described above, they might well be used, especially in conjunction with some crop like sweet potatoes, to help harden the soft pork resulting from a peanut ration. As a grazing crop, velvet beans



FIG. 9.—This field of velvet beans and cowpeas, following a crop of oats, harvested for grain, produced a great quantity of excellent grazing besides an abundance of humus to improve soil fertility. The velvet beans were planted in 6-foot rows, between the oat drills, when the oats were heading. The cowpeas were drilled in between the velvet-bean rows after the oats were harvested. The growth was secured on a soil considerably higher in fertility than the average of the region.

do not have the fattening qualities possessed by peanuts, though the pork produced is firm and of good quality.

The extensive production of velvet beans is rapidly making this crop an important source of concentrated feed to supplement corn. The difficulty in getting hogs to eat the beans is sometimes a serious one. To remove the beans from the hulls is rather difficult and expensive and to feed dry crushed velvet beans is not satisfactory because the pieces of hulls are so irritating that the hogs will not readily eat the meal. Many successful hog producers are feeding crushed beans (with hulls) with very satisfactory results by soaking the meal for from 12 to 24 hours. Often it may be difficult to start the hogs to eating this meal by itself, but this may be overcome by

mixing with an equal quantity of corn, both feeds being ground and soaked, a practice that is being used with excellent results by many of the best feeders.

However, the grinding of the beans and the double haul from the farm to the mill and return entail a large and needless expense. Nearly all feeding tests with hogs have shown that the feed saved by grinding will not cover the cost of the grinding. It is much more profitable to soak the velvet beans in the hulls for 24 hours, allowing the hogs to remove the hulls, which they will readily do when the beans are thus softened by soaking. Handled in this way, velvet beans furnish a satisfactory, very economical concentrated feed for the hog grower, if fed with corn.¹

SWEET POTATOES.

Sweet potatoes are utilized for grazing purposes to a limited extent by most of the hog growers in this section, and are deserving of an even wider use as a supplementary feed. In the majority of cases the hogs are given the use of only the culls left after harvesting the marketable part of the crop. This is no doubt the best practice when a sufficient acreage of sweet potatoes is grown, but the most successful hog growers are finding it highly profitable to plant one or more acres exclusively for "hogging" off. By themselves, sweet potatoes make too bulky a feed for finishing hogs, but as a supplement to other more fattening feeds they serve a useful purpose in adding variety to the ration and stimulating the appetite. They have a decided tendency to "harden" the soft pork produced by peanuts, and for that purpose they may be used to excellent advantage, especially when fed in conjunction with such crops as velvet beans or corn, or both.

Some growers are at first inclined to consider sweet potatoes planted exclusively for grazing to be an expensive feed. But it should be remembered that the crop is a heavy yielder, and will carry more hogs per acre than any other crop grown for grazing. An average acre of it will feed more than twelve hogs for two and one-third months. (See Table I.) In reality it is an economical source of feed. Furthermore, the cost of growing and hogging off an acre of sweet potatoes amounts to less than two-thirds (65 per cent) as much, and requires but a little more than half the amount of man and horse labor, as does the same acre harvested for home use or for marketing.²

¹ Experiments made by the Department of Agriculture indicate that velvet beans alone do not make a satisfactory feed for hogs.

² See Department of Agriculture Bulletin 648, pp. 49-50.

"SOFT" PORK.

When hogs are fed certain feeds, including peanuts and chufas, the pork becomes "soft," the fat melting at a lower temperature than does that on hogs fed on such feed as corn. Such pork "drips" badly during the curing or smoking processes, resulting in a low percentage of cured products and a dark colored, "oily" lard that on the market is considered very undesirable. The results obtained at a number of experiment stations in the South show that soft pork will not become firm in the cooler at ordinary temperatures, ranging from 29 to 34 degrees, but remains soft and flabby. The pork from peanut-fed hogs has a peculiar "nutty" flavor, which is not objected to by most persons acquainted with it, but which is discriminated against on markets accustomed to corn-fed hogs. This largely restricts the market for peanut-fed pork to southern points, and to a limited number of other markets which have become acquainted with it. Several markets in New England are beginning to take considerable quantities of this peanut-fed pork. For these reasons, the packing houses pay from $1\frac{1}{2}$ to 2 cents less per pound of live weight for "soft" hogs than for those which dress out "hard," the corn-fed hog being taken as the standard. In certain markets peanut-fed and grain-fed hogs are sold on the same basis provided the former carry a guarantee to cure "hard." But an increasing number of markets are buying the peanut-fed hogs at the lower price and later paying a premium for those that kill out "hard."

If hogs fattened on peanuts are removed from the peanut field and put on other feeds for from three to six weeks just prior to slaughtering, the pork will be materially "hardened" thereby. Grazing for 30 days on sweet potatoes and velvet beans, supplemented, if desired, by a light corn ration, will harden the meat sufficiently for home use or for the local markets, though frequently not to the extent that they will kill "hard," as that term is understood in the market centers. Cowpeas or one or more other grazing crops may be either added to or substituted for the velvet beans.

Farmers are frequently advised to feed a light corn ration (1 or 2 pounds per day per 100 pounds of live weight) to hogs while grazing peanuts, and during the last three or four weeks of the fattening period to substitute for the peanuts a full grain ration equal to about 4 pounds of grain per day for every 100 pounds of live weight. Feeding tests conducted by some of the experiment stations show that if during this short period of full grain feeding about one-fifth of the corn be replaced by cottonseed meal, the resulting pork will be appreciably harder than if corn alone is fed. Cottonseed meal should not, however, be fed to hogs in amounts larger than that named, nor

for a period longer than 30 days, or losses from poisoning are likely to result.

For home use or for local markets the unhardened peanut-fed pork will keep satisfactorily for a considerable time, particularly if slaughtered during the winter months, as is usually done. The flavor of such pork is not impaired until the warm weather of early summer, by which time it is likely to become somewhat "strong," due to the development of a slight rancidity. For consumption later than this, it is certainly advisable to use one of the methods described above for hardening the meat. In most cases the proper use of sweet potatoes and velvet beans or other grazing crops will prove satisfactory and decidedly cheaper than the feeding of any considerable amount of grain. At the present time some of the packing houses pay but little if any higher prices for peanut-fed hogs that have been given a finishing period on grain or other "hardening" feeds than they do for hogs brought to the same weight without this "hardening," though other packers do pay more for hogs that kill out satisfactorily. Unless the farmers receive a premium for this finishing it is hardly good economy for them to incur the expense involved. And as long as the margin of price between peanut-fed and grain-fed hogs does not exceed $1\frac{1}{2}$ to 2 cents per pound, as at present, it is exceedingly doubtful if the farmers in this section can afford to dispense with the use of this valuable and cheap fattening crop. At these prices most growers on the sandy soils of this area will rightly continue to make a liberal use of peanuts for fattening purposes.

TABLE I.—*Usual planting and grazing periods and carrying capacity of crops for grazing hogs (Southern Coastal Plain of Georgia).*

Crop	Usual planting period.	Usual grazing period.	Average length of grazing period.	Average number of hogs (150 pounds) per acre.	Average pounds of gain from an acre of crop.
			Months.		
Maintenance crops:					
Oats (grain crop).....	October.....	Jan. 1 to Mar. 1.....	1.9	3.5	.....
Oats for pasture only.....	October.....	Jan. 15 to May 10.....	3.7	3.7	.....
Rye pasture.....	October.....	Jan. 15 to May 1.....	3.5	3.8	.....
Rape.....	Nov. 15 to Feb. 1.....	Jan. 15 to May 15.....	3.2	6.3	.....
Bermuda grass.....		Apr. 15 to Oct. 1.....	5.5	a	.....
Cat-tail millet.....	Mar. 15 to Apr. 1.....	May 1 to July 10.....	2.3	12.0	.....
Sorghum.....	April.....	June 1 to Aug. 1.....	2.2	11.5	.....
Finishing crops:					
Cowpeas.....	April.....	June 15 to July 25.....	1.3	5.5	.....
Early Dent corn.....	Mar. 5 to Mar. 25.....	July 1 to Aug. 15.....	1.6	5.3	200
Spanish peanuts.....	Mar. 15 to Apr. 10.....	Aug. 1 to Sept. 20.....	1.6	5.5	358
Oat stubble.....		July 1 to Aug. 10.....	1.3	a	.....
Watermelon culls.....		June 1 to July 30.....	2.1	a	.....
Chufas.....	April and May.....	Sept. 15 to Dec. 1.....	2.1	a	.....
Sweet potatoes.....	May 5 to July 5.....	Oct. 20 to Dec. 31.....	2.3	12.7	.....
North Carolina peanuts.....	Mar. 20 to Apr. 15.....	Sept. 15 to Jan. 1.....	3.4	3.6	402
Velvet beans (in corn).....	April.....	Nov. 15 to Feb. 15.....	2.8	3.0	.....

a Insufficient data to furnish reliable averages.

CARRYING CAPACITY OF PASTURES.

In Table I are shown the average planting and grazing periods for the important pasture crops of the area, together with the average number of hogs that each of the crops will carry per acre for the grazing period (see also fig. 10). Sweet potatoes have the largest carrying capacity of all of the crops shown. An acre of sweet potatoes will, on the average, carry about 13 hogs of 150 pounds weight for 2.3 months, or the equivalent of about 29 hogs for one month.

CROPS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OATS, GRAIN CROP			-----									-----
OATS, PASTURE ONLY	-----	-----	-----	-----	-----	-----						-----
RYE PASTURE	-----	-----	-----	-----								-----
RAPE	-----	-----	-----	-----								-----
BERMUDA GRASS				-----	-----	-----	-----	-----	-----	-----		
CAT TAIL MILLET				-----	-----	-----	-----	-----	-----	-----		
SORGHUM					-----	-----	-----	-----	-----	-----		
COWPEAS					-----	-----	-----	-----	-----	-----		
OAT STUBBLE (CRAB GRASS) BEGGARWEED, ETC.)						-----	-----	-----	-----	-----		
EARLY DENT CORN						-----	-----	-----	-----	-----		
SPANISH PEANUTS							-----	-----	-----	-----		
NORTH CAROLINA PEANUTS	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
CHUFAS	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SWEET POTATOES	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
VELVET BEANS	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

— AVERAGE GRAZING PERIODS

----- SEASONS WHEN GRAZING IS FEASIBLE, THE LIMITS BEING MAINLY DEPEND-
ENT UPON THE TIME OF PLANTING.

FIG. 10.—Grazing periods for the principal crops used for hog pasture (average for 218 farms).

Cat-tail millet is a close second, with an average capacity of 28 hogs for a month; followed by sorghum, rape, oats or rye pasture, North Carolina peanuts, and Spanish peanuts with capacities of approximately 25, 20, 14, 12, and 9 hogs per acre, respectively. It should be borne in mind that the oats, rye, millet, and sorghum are maintenance crops and are frequently supplemented by light grain rations. On the other hand, early corn and peanuts are finishing crops, hence these furnish more feed than the above figures would indicate. The relatively low carrying capacity shown for velvet beans (3 hogs per acre) is deceiving, since the acres that grew velvet beans also produced a crop of corn at the same time (see p. 21). Bermuda grass and chufas also have large carrying capacities but not sufficient data are at hand to supply reliable averages. All of the data in Table I

and figure 10 are averages of a large number of actual records and estimates secured from 218 farms.

The average acre of crop land on these farms devoted to grazing crops throughout the growing season, either maintained two and one-fifth mature hogs through the year or brought that number of pigs to 200 pounds in weight. Some farms grazed considerably more hogs to the acre than this average, while some did not do nearly so well, the differences being due somewhat to the selection of grazing crops planted, but much more to the yields of the crops used. Numerous farm-management studies have shown that increasing the yields of crops to a point considerably above the average greatly decreases the cost per unit of crop and correspondingly increases the profits therefrom. Since, therefore, in this area the grazing crops make up two-thirds of the total cost of production, the importance of securing a good yield and resulting large carrying capacity of the grazing crops is apparent.¹

The 218 farms were divided into six groups, based on the number of hogs kept or produced per acre of crop land pastured. The farms that kept less than 1.5 hogs per acre produced live-weight gains of pork at an average cost of \$7.93 per 100 pounds. But as the number of hogs per acre increased through the other groups of farms the costs of the gains steadily and consistently decreased to the low cost of \$3.61 per 100 pounds on the farms that kept more than four hogs per acre.

A SUGGESTED GRAZING SYSTEM FOR HOGS.

In figure 11 is outlined a grazing system for a farm keeping 10 sows and one boar and raising 100 pigs per year. This size of business is chosen, not because it is necessarily the most economical or desirable, but because it is a convenient unit. The plan may easily be adapted to a larger or a smaller hog business by increasing or decreasing the sizes of the crop areas. Neither is the arrangement of the fields an essential part of the plan, since the best arrangement on any farm is a detail that will be determined by the topography of the farm and by the locations of the natural shade and water available.

While the plan outlined is based upon data secured in the southwestern part of Georgia, it is believed that, with relatively slight modification, it will apply nearly as well to the greater part of the Coastal Plain indicated by the light shading in figure 1. Where the types of soils or the rainfall differ from those existing in the im-

¹An acre of such crops as oats, rye, or rape, which occupied the land during only half of the crop season, has, for the present purpose, been considered as half an acre of crop land pastured. Other crops which kept the land out of other use during only a part of the season were reduced to their equivalents in a similar manner.

mediate area studied, some modifications in the selection of crops used or the area of the grazing crops required may be advisable. For example, on heavier types of soil soy beans may frequently be advantageously substituted for cowpeas, while vetch or crimson clover may be added to the oats or rye, bur clover may be added to the Bermuda pasture, and the use of peanuts dispensed with. However, the plan is not designed to fit the requirements on the heavier soils of the region. This plan is, therefore, intended to be elastic, and suggestive only. The list of grazing crops adapted to an area with such a long growing season is an extended one. A number of excellent crops have hardly been mentioned. The attempt has been to present a simple and economical yet adequate plan limited to and embodying those features which the experience of the most successful producers has demonstrated to be profitable. Many more complex grazing schemes were met with in this study. But it will ordinarily

<p style="text-align: center;">FIELD 6 - 35 A</p> <p style="text-align: center;">CORN, NORTH CAROLINA PEANUTS AND VELVET BEANS (CORN TO BE HARVESTED)</p> <p style="text-align: center;">(THIS FIELD TO BE A PART OF THE GENERAL FARM ROTATION)</p>	<p style="text-align: center;">FIELD 1 - 5 A.</p> <p>1ST PLANTING: OATS, RYE, RAPE</p>	<p style="text-align: center;">FIELD 5 10 A.</p> <p style="text-align: center;">FOR HOGS AND OTHER STOCK</p> <p style="text-align: center;">PERMANENT BERMUDA PASTURE</p> <p style="text-align: center;"><i>Plow every 1, 2 or 3 years and Seed to Oats or Rye</i></p>
	<p>2ND " CORN, VELVET BEANS, SWEET POTATOES</p>	
	<p style="text-align: center;">FIELD 2 - 5 A.</p> <p style="text-align: center;">CAT TAIL MILLET - SORGHUM</p>	
	<p style="text-align: center;">FIELD 3 - 5 A.</p> <p style="text-align: center;">EARLY CORN & SPANISH PEANUTS OR " " & COWPEAS</p>	
	<p style="text-align: center;">FIELD 4 - 5 A.</p> <p style="text-align: center;">EARLY CORN & SPANISH PEANUTS</p>	

FIG. 11.—Plan for a hog-grazing system to provide pasturage throughout the year for 10 sows, 1 boar, and 100 pigs.

be found that the simpler plans, provided they are adequate, may be more easily carried out and will show the larger profits at the end of the year.

This plan, evolved from the study of the experience of a large number of hog-producing farmers, has been discussed with and received the approval of a number of the more successful hog growers in the region, many of whom are already following systems that closely approximate it; for example, the three farms already cited. This is not a plan for an entire farm, but merely for supplying hog pasture, and it will fit in as a part of almost any plan for general or livestock farming in the area.

OUTLINE OF PLAN.

Fields 1 to 5 are to be permanently fenced and devoted continuously to grazing crops, and do not form a part of the general farm rotation. Fields 1 to 4 work into a four-year rotation, following

each other in the rotation in the same order that they are numbered. Field 6 is intended to be any one of the several fields in the general rotation for the farm. It may be located on any part of the farm inclosed by a hog-tight fence, and will be shifted from year to year to other parts of the farm.

If the general farm crops grown include such crops as oats, cow-peas, soy beans, peanuts for market, watermelons, or sweet potatoes, the waste or by-products from which incidentally furnish feed for hogs, the grazing systems planned should be accordingly modified. For instance, if oats are planted as a cash or feed crop, the grazing that it furnishes may replace a part or all of field 1.

FIELD 1.

This field is to be seeded in the fall to oats, rye or rape, any one or more of these to be planted singly or in any combination desired. This will furnish grazing until the end of May or the 1st of June, supplemented, however, until March 1 by the peanuts and velvet beans from the preceding year's planting in field 6, and from the middle of April by the millet and Bermuda in fields 2 and 5. If the Bermuda has been plowed and seeded to oats or rye the previous fall it will furnish additional supplementary grazing.

By June 1 this field may be plowed and planted to any other crop or crops. It is suggested that a part of it be planted to corn and velvet beans and the remainder to sweet potatoes. This makes an excellent combination for hardening off the soft pork produced by the peanuts in field 6, if that is desired. For that purpose the corn may well be hogged off. Or, if the pork is not to be hardened off, an acre or more of chufas may be planted in this field.

FIELD 2.

Field 2 should be planted to cat-tail millet, either with or without sorghum. If sorghum is planted, it may be seeded either in rows alternating with the millet, or in a separate part of the field (see p. 15). This field will be ready to graze from the middle or latter part of April until the middle of July, or considerably longer if it is needed. But by the date mentioned the quality of the grazing will not be as good as it was earlier in the season, unless more than one seeding of millet has been made, while field 3 will then be ready to be grazed. The millet and sorghum may be followed by oats or rye, seeded primarily as a cover crop, but incidentally to furnish some winter grazing.

FIELDS 3 AND 4.

Fields 3 and 4 should either be planted to early dent corn and Spanish peanuts, or one of the fields planted to that mixture and the other to early corn and cowpeas. The latter mixture has the ad-

vantage of being ready for grazing nearly a month earlier than the Spanish peanuts, but it will not furnish as large a yield of feed. The corn and cowpea mixture is also to be recommended if it is desired to finish off the fall pigs without turning them on peanuts, thus securing the higher prices paid for "hard" pork, as well as the generally higher prices prevailing on the early market. But in order to have the pigs ready for this early market, it is necessary to feed a heavier grain ration during the spring months than is required when the pigs are carried over the longer feeding period and cheaper feeds furnished by fields 5 and 6. If the corn and cowpea mixture is planted, it is possible to secure another crop of cowpeas the same season by planting a very early or "two-crop" variety.

Only hogs intended for market should be turned on field 3 at first. After the bulk of the crop is grazed off, the fattening hogs should be transferred to field 4, and the sows and spring pigs allowed to "clean up" the scattered feed. Fields 4 and 6 should be handled in a similar manner, the fattening hogs being grazed first, to be followed by the sows and small pigs to finish the fields. This procedure keeps the sows in good health by forcing them to take exercise and preventing them from getting too fat.

FIELD 5.

Field 5 is a permanent Bermuda pasture, 5 acres of which is intended to provide for the hogs. On most farms other classes of stock will be kept in the same pasture, hence the acreage shown in figure 11 is larger than that required by the hogs alone. This pasture should, when possible, be located where natural shade will be readily accessible. Ordinarily this will mean adjoining woodland. If natural shade is not available it is essential that artificial shade be provided.

FIELD 6.

Field 6, it has already been explained, is any one of the larger fields in the general rotation. This combination of corn, peanuts, and velvet beans is one that has recently become standard in the area where this study was made and is one worthy of adoption throughout most of the Coastal Plain. The corn and peanuts are planted in alternate rows and the velvet beans added to the rows of either the one or the other. The corn is to be harvested early, before the velvet beans' growth becomes too dense, and so that the hogs may be turned in to graze the peanuts. The corn from this field will furnish feed for all classes of the farm live stock, since about one-third of the yield will provide the grain needed by the hogs to supplement the grazing crops. This is assuming a yield of corn equal to the average obtained in the area studied. Unless at least 2 or 3 acres of sweet

potatoes have been planted in field 1, fully that area should be planted in field 6, preferably at one side of the field where it may be cut off by a temporary fence if desired.

The 35 acres in field 6 are considered as $17\frac{1}{2}$ acres of peanuts and velvet beans, since a crop of corn is grown and harvested, leaving only half of the acreage to be charged against the hogs.

In outlining this plan for a grazing system, yields of crops have been assumed somewhat above the averages secured on the 218 farms studied. Thus $42\frac{1}{2}$ acres of land devoted to grazing crops are expected to carry through the year a total of 111 hogs (boar, sows and pigs raised), bringing the pigs marketed to an average weight of 200 to 225 pounds live weight. This means slightly more than $2\frac{1}{2}$ hogs per acre, as compared with the average of $2\frac{1}{5}$ for the 218 farms (see p. 28). Two and a half hogs per acre can easily be carried on the average soils of this section, especially after the plan has been in operation for a year or more. With soils in a high state of fertility this average can easily be exceeded, but on soils low in fertility it is not safe to expect the carrying capacity to be as high as this average. There are in certain parts of the Coastal Plain, particularly near the coast, large areas of very light sandy soils, exceedingly low in fertility. On such soils fields 1 to 5 should be increased to 7, 8, or even to 10 acres each, and field 6 increased to 50 acres or occasionally to even more.

The crops in this grazing system include a considerable proportion of legumes, two of which—peanuts and velvet beans—when pastured, are among the best soil improvers known in this region. By this method of harvesting the crops a large amount of humus is added to the soil, resulting in a rapid increase in the fertility. Consequently the carrying capacity of land grazed in this way will rapidly increase. After three or four years at least 25 per cent more hogs should be produced on the same acreages of grazing crops.

EXPENSES OTHER THAN FOR FEEDS.

It has been pointed out that on these 218 farms the feed cost includes four-fifths¹ of the gross cost of hog production. Approximately half of the remaining costs, or one-tenth of the total cost, consisted of labor, and one-eighth of this charge consisted of mule labor, the other seven-eighths, of course, being man labor. On the average farm 55.4 days of man labor and 7.8 days of mule labor were spent on the hogs. This amounted to slightly less than one-half of a man day for every 100 pounds of live pork grown. This includes

¹ Of the gross cost of production the feeds represented 79.6 per cent, man labor 8.8 per cent, mule labor 1.1 per cent, interest 4.1 per cent, buildings and equipment 3.4 per cent, veterinary and serum 1.9 per cent, dips, minerals, and medicine 1 per cent, taxes on hogs 0.1 per cent. The credits to be deducted (manure credit and a very few receipts from breeding fees) amounted to 5.9 per cent of the gross cost.

only the labor spent directly on the hogs, such as the feed and care, watering, marking, dipping or oiling, vaccinating, etc. The labor of killing and curing the meat on the farm is not included, since the costs were figured on the basis of the live pork. On most of the farms the work on the hogs is done in the morning or evening and is in addition to the regular day's work in the field. The farmer is, therefore, often not inclined to consider this to be as large an item as it is. On the larger hog-producing farms, half or all of one man's time is required to look after the hogs. On some farms the hauling of water to hogs on pasture during certain seasons consumes a large amount of time and is a considerable expense. Much of this and the other labor on hogs can be saved by a proper planning and arrangement of the pastures, fences, and wells. One convenient arrangement of field regularly pastured by hogs is seen in figure 11. In this case either a well should be located in or near the short lane connecting the fields 1 to 5, or water should be piped to that point.

The next largest expense was the item of interest, amounting to somewhat less than half as much as the labor charge. It consisted principally of the interest (at 8 per cent) on the value of the stock hogs carried over from one year to the other, but included also the proportional share of the interest on the cash to run the farm business. This is a considerable item and one often overlooked.

The annual cost of buildings and equipment was a little less than the interest charge, or \$25.85 per farm. This includes the depreciation, repairs, and interest on the investment in fences, hog houses, shelters, watering systems, dipping vats, troughs, and other miscellaneous equipment, or the share of these that was properly chargeable to the hogs. The climate here is so mild that but few, simple, and inexpensive buildings are required. Much the greater part of this charge was due to the fences. Most of the farms are fenced with high woven wire or woven wire and one or two barbed wires. These fences, at pre-war prices, cost from \$150 to \$175 per mile to build new. The annual charge to cover interest, repairs, and depreciation of wire and posts on this type of fence amounts to about 15 per cent of the value. The hogs were charged with only the amount of fence maintained in addition to that which would have been needed if hogs had not been kept. On most of the farms this amounted to from one-fourth to one-half of the total farm fence, or an average of about 1 mile of fence per farm.

The payments for veterinary services and antihog-cholera serum averaged \$14.26 per farm, or about 2 per cent of the cost of production. The serum accounted for nearly all of this item. Many of the farmers, however, did not use serum, hence this average cost was only about one-half as large as it was on those that did use it. Under

normal conditions, about 30 cents¹ per hog or pig will be found a minimum allowance to cover the cash outlay when the farmer does the inoculating himself. When it is considered how large and widespread the losses from cholera have been each year, the cost of inoculation will be found to be cheap insurance against such losses. Dips, minerals, medicines, and tonics amounted to about half as much as the serum cost. The largest items under this heading were, crude oil applied to kill lice, and copperas, charcoal and salt used as tonics. Taxes on hogs and cash expense for breeding fees together amounted to less than \$1 per farm.

An increasing number of farmers, though still relatively few, are using the "simultaneous treatment" and raising hogs immune to cholera. This is the surest way of meeting the hog-cholera problem. This method requires a greater outlay than does the use of serum, since the services of a veterinarian are usually necessary, and great care is needed in handling the virus to prevent the further spread of the disease, but when properly done the result is practically the elimination of losses from cholera.

NUMBER OF HOGS TO RAISE.

The number of hogs that a farm should maintain is a question to be determined by the type of farming followed, the adaptability of the soil to the principal cheap grazing crops, and the personal inclinations of the farmer. Hog raising fits in well with most of the farm enterprises found in this region, and it may readily be limited to a few pigs kept merely to utilize the waste products, or it may profitably be expanded to become a main part of the farm business. At least a sufficient number should be kept to utilize such otherwise unconsumable products as the waste or by-products from oats (shattered grain, and green pasturage), peanuts, velvet beans, soybeans, watermelons, and sweet potatoes.²

¹ Based on 1916 prices for serum.

² Nearly every farmer in this section of the Coastal Plain keeps some hogs; many, as has been stated, have gone into the business on a more or less extensive scale, while many others are contemplating greatly increasing the extent of their hog-raising operations. It is of interest, therefore, to know if there is, under the conditions prevailing, a most profitable size for the enterprise or whether it may with profit be conducted on a large scale. The 218 farms studied throw some light on this question. These farms fairly represent all sizes of the hog-raising enterprise from 20 farms supporting 3 or less brood sows per farm to 21 farms having more than 20 sows each, with an average of 37½ sows. One farm had 98 sows and another kept 130, while the average of all of the farms was 10½ sows, raising 75 pigs to the point of sale or slaughter. The farms with 3 sows or less produced pork at a cost of \$5.93 per 100 pounds of live weight. As the size of the business increased the cost decreased to \$5.66 on the farms with 8 to 9 sows, beyond which point the costs gradually increased to \$5.89 on the farms keeping from 13 to 20 sows and \$6.27 on those with more than 20 sows. This indicates the most economical production on farms keeping 8 to 9 sows. However, the differences in average costs were not great, and it is evident that the enterprise has a wide range of adaptability. Hog raising is, and no doubt will continue to be, conducted on nearly all of the farms in this section as one of several sources of farm sales, though on many it is and will be the largest enterprise. On only one farm met with did hogs furnish practically all of the farm income.

ONE LITTER PER YEAR, OR TWO?

One of the important expenses of hog production is the cost of keeping the sows. If any sow fails to breed, or aborts, her whole expense for the season must be borne by the pigs raised by the other sows. In fact, the entire expense of keeping all of the sows must be distributed over the number of pigs actually raised to the point of slaughtering or marketing. This expense, added to that of keeping the boar, represents the charge against each of these pigs at the time it is born. If the number of pigs raised per sow is small, the charge against each pig at time of birth is proportionately large and has an important bearing upon the profits or losses from the business at the end of the year.¹

The number of pigs that are raised per sow may be materially increased either by giving more attention and better care to the sows and small pigs or by increasing the number of litters that are raised from each sow. In such a region as this, with mild winters and year-round pastures, it is possible and practicable to secure two litters per year. In fact, one-fourth of 218 farms studied obtained such an average. It is quite possible to obtain five litters in two years, though such a practice is too great a drain on the vitality of the sow, and is not to be recommended. However, it costs somewhat more to raise litters farrowed in the fall than it does to raise those farrowed in the spring, and this to a certain extent nullifies the advantage of the lower initial cost of the pigs when two litters are raised. The fall litter is the more expensive because such pigs are larger and require more feed during the months of March and April than do the spring pigs. It is during these and the immediately succeeding months that feed is the most costly and hardest to procure.² Nevertheless the experience of successful hog growers in this region would seem to indicate that it is somewhat more profitable to raise two litters per year than one.

¹ To ascertain the practical importance of this item of expense, the 218 farms were divided into three groups, namely, those that raised respectively fewer than 6, from 6 to 10, and more than 10 pigs per sow. The average costs of production on these groups of farms were \$6.28, \$5.98, and \$4.97 per 100 pounds of gains. These figures indicate that it is well worth while to raise the larger number of pigs per sow, thus distributing the sow charge over the larger number of units, thereby reducing the cost per pig.

² The higher cost of feed for the fall litters does not offset all of the advantage obtained in the lower initial cost of the pigs when two litters per year are raised. This was shown when the 218 farms were divided into three groups based on the number of litters raised per sow. The farms on which the sows averaged less than one and one-half litters each produced live-weight gains at a cost of \$5.95 per hundred pounds, while those that raised one and one-half or more, but less than two litters, produced gains for \$5.89; and on the 54 farms that averaged two litters from every sow the gains cost \$5.75. These differences in costs are not large, but they do show a measurable economy in favor of raising the larger number of litters per sow.

TIME OF FARROWING AND MARKETING.

The mild winters and long growing season of this section make it unnecessary to provide more than but slight protection from the elements (fig. 12), and result in cheap and abundant grazing throughout the winter months. For these reasons it is here easier and cheaper to feed and care for pigs farrowed in the fall than it is in places farther North, and it is less necessary that the pigs should come during rather definite periods. As a result it is a common practice on a large proportion of the farms to have pigs farrowed during practically all months of the year, with the fewest arriving during June, July, and December. Nevertheless, there are distinct advantages in having the farrowing occur during more or less well-defined seasons, and most

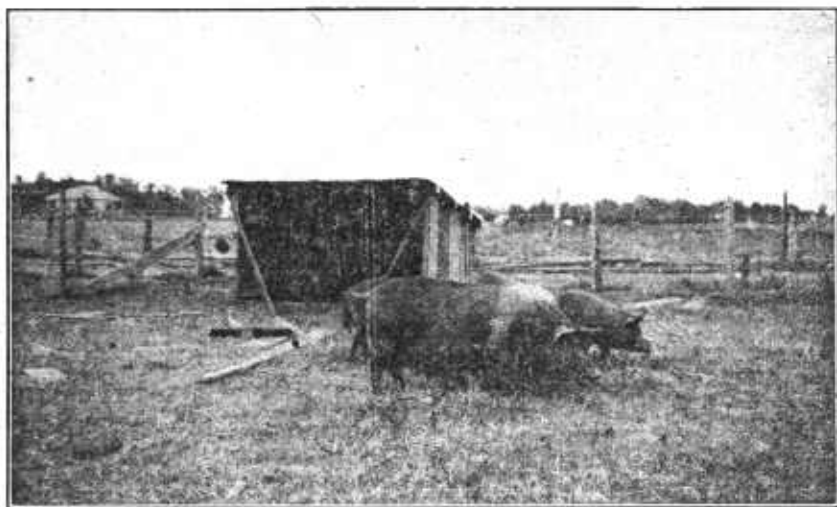


FIG. 12.—In this mild climate but few and inexpensive shelters are needed for hogs. Shade in summer and protection from the occasional cold rains in winter suffices.

of the experienced growers endeavor to have the pigs dropped during certain months. February to April for the spring litters and September to November for the fall pigs are undoubtedly the most desirable periods; or, to limit them more closely, the months most favored are March and April, September and October. By many April is given preference over March because of the milder weather and more abundant pasturage then prevailing, while October is preferred to September, because the former is less likely to be dry and dusty, and hence less severe on the small pigs.

The time at which the pigs are to be marketed, as well as the speed with which they are to be prepared for the market, will, to a large extent, determine the time most desirable to have the pigs farrowed. If an abundance of spring and early summer grazing is provided, and

it is desired to push the fall pigs so as to take advantage of the usually higher prices prevailing on the summer or early fall market, September is more desirable for farrowing than a later month. On the other hand, if many of the pigs are to be carried over for the high market prices during March, the later farrowing periods of October or November are to be preferred to an earlier date. From March to October is the period when hogs bring the best prices, the highest point usually being reached in September. During December and January, the months when the greatest number of hogs are sent to market, the prices are ordinarily from 1 to 1½ cents per pound lower than during the months of highest prices, yet there are times when the top prices for the year are paid during these months.

THE MOST PROFITABLE MARKETING WEIGHTS.

Experimental evidence has repeatedly and conclusively shown that the older an animal becomes or the more advanced the degree of fattening the greater is the amount of feed required to produce a pound of gain. Pigs should, therefore, be brought to a profitable marketable weight as quickly as practicable, due consideration being given to the cost of the feeds used. But there are certain large and more or less fixed charges that must be borne by the pigs marketed, and the larger these pigs are when disposed of the less is this charge per pound of live pork, since it is then distributed over a greater total number of pounds. These "overhead" expenses include the initial charge against the pigs at time of birth, and a large proportion of the costs of labor and equipment, serum, and veterinary charges, and other items of lesser importance. These two conflicting sets of costs, the increasing cost of feed and the decreasing "overhead," are further complicated by the fact that the market prices vary for hogs of different weights.

It was found that of the 218 farms studied in this region those that marketed or butchered their hogs at 175 to 200 pounds weight produced pork at the lowest rate per pound.¹

The market demand is, however, for hogs weighing something over 200 pounds, and a substantial premium is paid for animals of that size. A study of the prices paid for hogs on one of the principal markets of the region showed that this premium more than offset the slightly higher cost of carrying hogs to weights somewhat over 200 pounds. Everything considered, it is believed that under prevailing conditions of production and marketing the most profitable weight at which to market hogs in this section is somewhere between 200 and 250 pounds, perhaps about 225 pounds.

¹ Hogs disposed of at average weights of less than 125 pounds, 125 to 149, 150 to 174, 175 to 199, and 200 pounds and over, cost, respectively, to produce 100 pounds of gain \$8.18, \$6.36, \$5.66, \$5.05, and \$5.32.

CHOLERA AND OTHER DISEASES.

It is no exaggeration to say that losses from cholera have for years been the chief obstacle to hog raising in this region. These losses were so large in many localities where the data in this bulletin were gathered that on a large proportion of the farms it was impossible to secure usable cost records. Yet these losses were but little or no greater than the average losses over the preceding series of years.

During recent years the methods of combating hog cholera have been developed to the point where these losses are now very largely avoidable. When it is known that cholera exists in the locality, all of the herd, unless already immune, should be treated at least with antihog-cholera serum, and preferably by the simultaneous method. If any pigs become sick they should be separated from the rest of the herd. The serum gives only a temporary immunity to the disease, lasting for a period of greater or shorter length, depending upon the amount and quality of the serum used and the age and condition of the pigs. This immunity may usually be safely expected to last for at least three or four weeks.

If cholera remains in the neighborhood, it may be necessary to repeat the inoculation if serum alone is used. While serum has a certain amount of curative value in the early stages of the disease, it should be remembered that it is primarily a means of prevention and not of cure and should be used in conjunction with sanitary and quarantine measures.¹

Heavy losses also occur annually from pneumonia and lung worms, as well as from various intestinal and skin parasites. These disorders are particularly prevalent and severe where hogs are allowed to run on the open range or large areas of woodland, a practice that is followed on a very large but decreasing proportion of the farms in this section. Hogs pastured in this way are particularly exposed to infection, their vitality and powers of resistance are usually lowered by undernourishment, and they can not be satisfactorily treated. The skin parasites, mainly lice, are treated by dipping, spraying, or washing with dips or oils. Crude oil is most commonly used, being applied either directly to hogs, on the surface of wallows, or on rubbing posts. In the treatment of all of these disorders, sanitary measures, designed particularly to remove the sources of infection, are of special value.²

¹ See Farmers' Bulletin 834, Hog Cholera: Prevention and Treatment.

² See Farmers' Bulletin 874, Swine Management.

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